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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/635,816	08/07/2003	Eiji Shidoji	24131SUS-2CONT	9769
22850	7590	07/09/2004		
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER VERSTEEG, STEVEN H	
			ART UNIT 1753	PAPER NUMBER

DATE MAILED: 07/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/635,816

Applicant(s)

SHIDOJI ET AL.

Examiner

Steven H VerSteeg

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*elo*

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 15 September 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 18, 21 and 22 is/are allowed.
- 6) ☒ Claim(s) 1-17, 19, 20 and 23-33 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 9/15/03.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION*****Priority***

An application in which the benefits of an earlier application are desired must contain a specific reference to the prior application(s) in the first sentence of the specification or in an application data sheet (37 CFR 1.78(a)(2) and (a)(5)). The specific reference to any prior nonprovisional application must include the relationship (i.e., continuation, divisional, or continuation-in-part) between the applications except when the reference is to a prior application of a CPA assigned the same application number.

***Specification***

1. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-17, 19, 21, and 23-33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. The term "carousel-type" in claims 1, 5, 20, and 23 is a relative term which renders the claim indefinite. The term "type" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be

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reasonably apprised of the scope of the invention. The word type is an indefinite term as described in M.P.E.P. § 2173.05(c).

5. Claims 2-4, 6-17, and 19 depend from claim 1 and contain all of the limitations of claim

1. Therefore, claims 2-4, 6-17, and 19 are rejected for the same reasons as claim 1.

6. Claims 24-33 depend from claim 20 and contain all of the limitations of claim 20.

Therefore, claims 24-33 are rejected for the same reasons as claim 20.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1, 6-8, 14, 20, 24, 25, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 1,046,727 A2 to Nippon Sheet Glass Co. LTD. (Nippon) in view of JP 7-109569 (JP '569).

9. For claim 1, Applicant requires a carousel-type sputtering apparatus which is configured so that a drum, which is formed in a polygonal or circular shape in transverse cross-section, is provided so as to be rotatable in a chamber, the drum having substrate holders provided on an outer peripheral surface; magnetron sputtering sources are provided inside a chamber wall; each of the magnetron sputtering sources comprises a target and a magnetron unit for holding the target; and the targets are held so as to be parallel with a rotary axis of the drum by the magnetron units; the sputtering apparatus comprising: a film thickness measuring instrument, which measures a thickness of a film deposited on a substrate mounted on a substrate holder

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during film deposition; a power supply unit, which supplies the respective targets with power required for sputtering; and a controller, which controls parameters affecting on an amount of film deposition, based on measurement results obtained by the film thickness measuring instrument.

10. For claim 20, Applicant requires a sputter film deposition method using a carousel-type sputtering apparatus which is configured so that a drum, which is formed in a polygonal or circular shape in transverse cross-section, is provided so as to be rotatable in a chamber, the drum having substrate holders provided on an outer peripheral surface; magnetron sputtering sources are provided inside a chamber wall; each of the magnetron sputtering source comprises a target and a magnetron unit for holding the target; and the targets are held so as to be parallel with a rotary axis of the drum by the magnetron units; the method comprising: measuring a thickness of a film deposited on a substrate mounted on a substrate holder during film deposition; and controlling parameters affecting on an amount of film deposition, based on measurement results obtained by the film thickness measuring step.

11. Nippon discloses a carousel sputtering apparatus (Figure 5) comprising a drum 9 that rotates comprising magnetron sputtering sources (1A, 2A, 1B, 2B) with a target (2A and 2B) and a magnetron unit (1A and 1B) that are parallel with a rotary axis of the drum (Figure 5). The targets are powered by a power supply [0024].

12. Nippon does not disclose a film thickness measuring instrument or a controller that controls parameters affecting the amount of film deposition based upon measurement results obtains by the film thickness measuring instrument.

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13. JP '569 discloses controlling film deposition based upon measurements of the film [0006]. Controlling the thickness based upon measurements allows for better mass production of large sized substrates [0001].

14. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Nippon to utilize a thickness measuring instrument and a controller that controls the deposition based upon the measurements because of the desire to have better mass production capabilities for large sized substrates.

15. For claim 6, Applicant requires the targets to be a target for depositing a low refractive index film and a target for depositing a high refractive index film. Nippon deposits separate layers from the cathodes [0030]. Each target can arbitrarily be referred to as either a high or lower refractive index film.

16. For claim 7, Applicant requires the film thickness measuring instrument to comprise a light emitter and a light receiver. For claim 24, the light is radiated onto the substrate during rotation and the reflected light is measured to generate an electrical signal. JP '569 discloses that the thickness is measured with a light emitter and receiver [0013].

17. For claim 8, Applicant requires calculating means for finding transmittance information or reflectance information based upon the signal output. For claim 25, Applicant requires calculating transmittance or reflectance based upon the output. JP '569 discloses the limitation [0013].

18. For claims 14 and 31, Applicant requires the film thickness measuring instrument to be provided at a portion far from the magnetron sputtering sources. Any location within the chamber can arbitrarily be considered to be "far" from the sources.

*Allowable Subject Matter*

19. Claims 18, 21, and 22 are allowed.
20. Claims 2-4, 9-13, 15-17, 19, 26-30, 32, and 33 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.
21. Claims 5 and 23 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.
22. The following is a statement of reasons for the indication of allowable subject matter: it is neither anticipated nor obvious over the prior art of record to have a sputtering apparatus as claimed by Applicant in claims 2, 9, 10, 15, 18, or 19; or a sputter film deposition method as claimed by Applicant in claims 21, 26, 27, 32, and 33.
23. Nippon and JP '569 do not disclose AC magnetron sputtering sources with each source having two adjacent targets that alternate between anode and cathode relationship.
24. US 5,154,810 to Kamerling et al. (Kamerling) discloses a carousel sputtering apparatus, but there is no AC power to the sources and the sources do not each have two adjacent targets.
25. US 6,338,777 B1 to Longstreth White discloses AC power to plural sources with each source having two targets wherein each target acts as cathode and then anode. Longstreth White does not disclose a rapid film deposition to a value just smaller than the targets thickness and then a slow deposition using only a magnetron sputtering source to deposit up to the target film thickness.
26. Neither Nippon, JP '569, Kamerling, nor Longstreth White discloses finding the transmittance or reflectance in response to incident angles or a light emitter selective radiating a

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plural kings of measuring light with different wavelengths onto the substrate, or a light shielding pipe between an inner wall of the chamber and the substrate holder so as to encircle a light path, or having the target surface inclined at an angle that when the target is not parallel to the substrate when confronting the substrate.

27. Combining the references would not render obvious Applicant's claimed invention.

### ***General Information***

For general status inquiries on applications not having received a first action on the merits, please contact the Technology Center 1700 receptionist at (571) 272-1700.

For inquiries involving Recovery of lost papers & cases, sending out missing papers, resetting shortened statutory periods, or for restarting the shortened statutory period for response, please contact Denis Boyd at (571) 272-0992.

For general inquiries such as fees, hours of operation, and employee location, please contact the Technology Center 1700 receptionist at (571) 272-1300.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven H VerSteeg whose telephone number is (571) 272-1348.

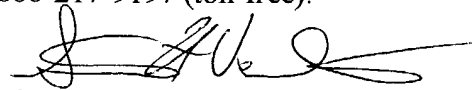
The examiner can normally be reached on Mon - Thurs (6:30 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Steven H VerSteeg  
Primary Examiner  
Art Unit 1753

shv  
July 6, 2004